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;
; PROGRAM ID: BIOS LOADER TRANSIENT
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;
; PROPERTY OF: JADE COMPUTER PRODUCTS
; 4901 W. ROSECRANS BLVD.
; HAWTHORNE, CALIFORNIA
; 90250, U.S.A.
;
*****
;
; VERSION: 2.2
;
*****
; THE BIOS LOADER IS READ INTO THE DCM SECTOR BUFFER *
; AFTER THE DCM PROGRAM HAS INITIALIZE. THIS PROGRAM *
; THEN READS THE BIOS MODULE (1K) INTO BANK 1. THE *
; COMMAND BLOCK IN DCM IS SET TO INDICATE THE BIOS *
; MODULE SIZE AND ITS LOAD ADDRESS. THE BIOS LOADER *
; PROGRAM IS GENERATED BY MOVCPM.COM AS THE COLD *
; START LOADER (900-97F HEX).
; ***** SK *****
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;*****
; CONTROLLER PORT ASSIGNMENTS
;*****

0000      BL.STS  ==      000H      ;BOARD STATUS
0000      BL.CTL  ==      000H      ;BOARD CONTROLS
0004      WD.CMD  ==      004H      ;1791 COMMAND REGISTER
0004      WD.STS  ==      004H      ;1791 STATUS REGISTER
0006      WD.SEC  ==      006H      ;1791 SECTOR REGISTER
0007      WD.DTA  ==      007H      ;1791 DATA REGISTER
0010      XP.MTO  ==      010H      ;MOTOR TIME OUT
0040      XP.MTX  ==      040H      ;MOTOR TIME EXTEND
0080      XP.DSH  ==      080H      ;DATA SYNC HOLD

;*****
; 1791-01 COMMAND AND MASK.
;*****

0080      DC.RDS  == 10000000B      ;READ SECTOR.
009C      DM.RER  == 10011100B      ;READ ERROR MASK.

;*****
; SYSTEM ASSIGNMENTS
;*****

0014      NMBR.K  ==      20          ;SYSTEM SIZE IN K.
0400      LNG.1K  ==     1024          ;TOTAL BYTES IN 1K.
5000      CPM.SZ  ==     NMBR.K*LNG.1K ;TOTAL SYSTEM BYTES.
0600      BIOS.S  ==     LNG.1K*3/2    ;BIOS ALLOCATED SIZE.
4A00      BIOS.A  ==     CPM.SZ-BIOS.S  ;BIOS LOAD ADDRESS.

;*****
; INTERNAL MEMORY ASSIGNMENTS
;*****

1000      BANK.O  ==     1000H          ;LOWER BANK ADDRESS.
0400      BANK.L  ==     0400H          ;1K BANK LENGTH.
1400      BANK.1  ==     BANK.O+BANK.L  ;UPPER BANK ADDRESS.
1370      IO.BLK  ==     BANK.O+0370H   ;I/O BLOCK ADDRESS.
1377      CB.STS  ==     IO.BLK+0007H   ;COMMAND STATUS BYTE.
1378      CW.LAD  ==     IO.BLK+0008H   ;BIOS LOAD ADDR LOC.
137A      CW.LNG  ==     IO.BLK+000AH   ;BIOS LOAD LENGTH LOC.
1380      SEC.BF  ==     BANK.O+0380H   ;SECTOR BUFFER AREA.

;*****
; BIOS PROGRAM LINKAGE.
;*****

0004      SEC.BG  ==      4              ;FIRST BIOS SECTOR.
0008      SEC.NM  ==      8              ;NUMBER OF SECTORS.
000B      SEC.EX  ==     SEC.BG+SEC.NM-1 ;LAST BIOS SECTOR.

;*****

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; *****
; ASSEMBLER DIRECTIVES
; *****

        .PABS
        .PHEX
        .XLINK
1380      .LOC      SEC.BF      ;PROGRAM START POINT

; *****
; PAUSE MACRO.  ALLOWS 1791 TO DIGEST INSTRUCTIONS!
; *****

        .DEFINE PAUSE = [
                XTHL
                XTHL
                XTHL
                XTHL]

; *****
; INITIALIZE BIOS READ OPERATION
; *****

1380      21 0400      BEGIN: LXI      H,LNG.1K      ;BIOS LOAD LENGTH.
1383      22 137A      SHLD      CW.LNG      ;LOAD LENGTH SET.
1386      21 4A00      LXI      H,BIOS.A      ;BIOS SYSTEM ADDR.
1389      22 1378      SHLD      CW.LAD      ;LOAD ADDRESS SET.
138C      21 1400      LXI      H,BANK.1      ;BIOS LOAD POINT.

; *****
; SET-UP FOR EACH READ SECTOR COMMAND
; *****

138F      FD21 13AB      RD.SEC: LXI      Y,RD.TST      ;SET NMI VECTOR.
1393      3A 13C7      LDA      SECTOR      ;FIRST BIOS SECTOR.
1396      A9          XRA      C      ;INVERT (1791-01).
1397      D306      OUT      WD.SEC      ;SET 1791 SEC REG.
1399      3E80      MVI      A,DC.RDS      ;READ SECTOR CMND.
139B      A9          XRA      C      ;INVERT (1791-01).
139C      D304      OUT      WD.CMD      ;ISSUE 1791 COMMAND.
139E      E3          PAUSE      ;ALLOW 1791 TO SETTLE.

; *****
; READ SECTOR OPERATION
; *****

13A2      DB80      RD.BYT: IN      XP.DSH      ;WAIT FOR DATA.
13A4      DB07      IN      WD.DTA      ;INPUT INV DATA.
13A6      A9          XRA      C      ;INVERT (1791-01).
13A7      77          MOV      M,A      ;STORE DCM BYTE.
13A8      23      INX      H      ;INCREMENT POINTER.
13A9      18F7      JMPR      RD.BYT      ;REPEAT OPERATION.

; *****

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;*****
; CHECK READ SECTOR STATUS, REPEAT UNTIL BIOS LOADED *
;*****

13AB    E69C      RD.TST: ANI      DM.RER      ;TEST FOR ERRORS.
13AD    200D             JRNZ     ERRORS      ;ERROR DETECTED.
13AF    3A 13C7     LDA      SECTOR      ;GET SECTOR NMBR.
13B2    FE0B             CPI      SEC.EX     ;CHECK IF LAST SEC.
13B4    290F             JRZ      FINISH     ;GO IF FINISHED.
13B6    3C             INR      A          ;INCREMENT.
13B7    32 13C7     STA      SECTOR      ;STORE AWAY.
13BA    18D3             JMPR     RD.SEC     ;READ NEXT SECTOR.

;*****
; READ ERROR HAS BEEN DETECTED *
;*****

13BC    32 1377     ERRORS: STA      CB.STS     ;DISPLAY ERROR STATUS.
13BF    AF             XRA      A          ;ZERO A REGISTER.
13C0    D300             OUT     BL.CTL     ;DESELECT DRIVE.
13C2    DB10             IN      XP.MTO     ;MOTOR OFF!
13C4    76             HLT              ;TERMINATE.

;*****
; BIOS SECTOR HAVE BEEN LOADED *
;*****

13C5    FB          FINISH: EI              ;ENABLE INTERRUPTS.
13C6    76             HLT              ;SHUTDOWN BOARD.

;*****
; SECTOR NUMBER STORAGE *
;*****

13C7    04          SECTOR: .BYTE  SEC.DG      ;SECTOR COUNTER.

;*****
      .END

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BANK.O 1000	BANK.I 1400	BANK.L 0400	BEGIN 1380
BIOS.A 4A00	BIOS.S 0600	BL.CTL 0000	BL.STS 0000
CB.STS 1377	CPM.SZ 5000	CW.LAD 1378	CW.LNG 137A
DC.RDS 0080	DM.RER 009C	ERRORS 13BC	FINISH 13C5
IO.BLK 1370	LNG.1K 0400	NMBR.K 0014	RD.BYT 13A2
RD.SEC 138F	RD.TST 13AB	SECTOR 13C7	SEC.BF 1380
SEC.BG 0004	SEC.EX 000B	SEC.NM 0008	WD.CMD 0004
WD.DTA 0007	WD.SEC 0006	WD.STS 0004	XP.DSH 0080
XP.MTD 0010	XP.MTX 0040		